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ABSTRACT

Educational institutions have neglected an urgent need to prepare workers for high-skill, high-performance jobs. Among the challenges states face are the following: (1) strengthening the basic skills achievements of all students, especially those from disadvantaged environments; (2) linking schools, colleges, communities, and work; (3) assessing skills and other outcomes that show what students know and can do; (4) conducting state-level comprehensive planning and coordinating programs, services, and financial resources; and (5) developing incentives and accountability mechanisms that promote and ensure successful efforts. Five areas through which higher education can work in partnership with elementary and secondary education, business, industry, labor, and government to build and support a high quality work force readiness system are as follows: program quality, school-college-work connections, skills assessment, state planning and coordination, and incentives and accountability. (A notes section contains 92 citations to other reports on educational quality and skill needs.) (KC)

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BUILDING A QUALITY WORKFORCE

An Agenda for Postsecondary Education

A Report of the

SHEEO Committee on Workforce Preparation

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BUILDING A QUALITY WORKFORCE

An Agenda for Postsecondary Education

A Report of the

SHEEO Committee on Workforce Preparation

Diane S. Gilleland, Chair
Director, Arkansas Department of Higher Education

Esther M. Rodriguez
Project Director and Principal Author

James R. Mingle
Executive Director

September 1992

SHEEO

State Higher Education Executive Officers
707 17th Street, Suite 2700
Denver, Colorado 80202-3427

Copies of this book are available for $10.00 from the State Higher Education Executive Officers, 707 17th Street, Suite 2700, Denver, Colorado 80202-3427, 303-299-3686.

The State Higher Education Executive Officers is a nonprofit, nationwide association of the chief executive officers serving statewide coordinating boards and governing boards of postsecondary education. Forty-nine states, the District of Columbia and Puerto Rico are members.

SHEEO COMMITTEE ON WORKFORCE PREPARATION

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Idaho State Board of Education

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Commissioner
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Illinois Board of Higher Education

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EXECUTIVE SUMMARY

In the world economy today, high-skilled, technology-intensive production and services are concentrated in the developed nations. Technology-poor production and services have shifted to the less developed nations. It is well known that this is happening. One can read about it in the daily papers, hear it on local and national news reports, its impact is felt in our communities. America's assembly-line production jobs are going to other countries where the cost of labor is cheap.

A system of high-quality occupational education and training is essential to our nation's ability to respond to these economic challenges. But an effective system will require the active participation of many sectors, including higher education, the schools, the business community, labor unions, and political leaders. Among the challenges states face are the following: (1) strengthening the basic skills achievement of all students, especially those from disadvantaged education and economic environments; (2) linking schools, colleges, communities and work; (3) assessing skills and other outcomes that show what students know and can do; (4) conducting state-level comprehensive planning and coordinating programs, services and financial resources; (5) and developing incentives and accountability mechanisms that promote and ensure successful efforts.

The State Higher Education Executive Officers (SHEEO) recognize that higher education must expand its traditional focus on baccalaureate and advanced-degree achievement to include preparation for work. State political and business leaders want and need the assistance of higher education in developing a first-class workforce, through, for example, curriculum development, program articulation, planning and coordination.

In this report, *Building a Quality Workforce: An Agenda for Postsecondary Education*, SHEEO suggests five areas through which higher education can work in partnership with elementary and secondary education, business, industry, labor and government to build and support a quality workforce readiness system.

1. Program Quality. A central problem of many secondary and postsecondary vocational education programs is the lack of attention paid to basic-skills development. States are finding that students leaving a number of these programs do not have the level of computation, communication and analytical skills necessary for today's highly technical workplace. Consequently, few students reap the rewards they may expect. Many remain unemployed. Those who do find jobs often earn minimum wages.

Many states are making the improvement of basic skills the first priority in preparing students for work as well as for further education. One strategy for improving the basic skills of students is to forge academic and vocational courses into more challenging and rigorous programs. This is being done successfully in a growing number of tech-prep programs using applied academic courses and sequential curricula.

The tech-prep program, developed jointly by two-year colleges and high schools, is an articulated, applied academics program that combines a common core of academics (math, science and communications) with the specifics of advanced-skill technical education. Beginning with their junior year in high school, students continue for four years with a structured, closely coordinated program, first in high school, then in community or technical college. They end up with an advanced-skills associate degree that prepares them either for entry into the job market or allows them to continue their education in a baccalaureate degree program.

Changes needed in program quality include the following:

- Higher education leaders should make quality vocational programs a high priority.
- Students' basic skills should be strengthened.
- Programs should be academically rigorous and blend theoretical concepts with practical applications. If this is accomplished, then vocational programs can be part of the coursework acceptable for earning a baccalaureate degree.

2. School/College/Work Connections. The American system of secondary and postsecondary education suffers from a disconnection between schooling and work. Business and industry involvement is scarce. The courses students take rarely integrate theoretical and academic instruction with practical application. Few students have opportunities to participate in apprenticeship or cooperative programs that combine classroom- and work-based learning. Many vocational education students are left on their own to chart their occupational and career futures. The result is unacceptably high dropout rates.

Although few in number and limited in scope, new models are being developed across the country. In these programs, state and local business leaders are becoming primary partners in curriculum design and instruction. Counseling and job information is also being upgraded. But while career counseling is considered vital, it is still not a priority in many state workforce preparation plans. One reason cited for poor counseling is that many counselors, teachers and faculty, parents and others view vocational-technical education programs as dumping grounds for students who cannot succeed in regular academic programs. Counselors are reluctant to guide students into vocational-technical programs because they do not perceive them as contributing to a student's future success. The opposite occurs for college-prep programs for university-bound students. This image should change as this country comes to value education for work as a necessary endeavor and workers as respected national assets.

Changes needed in school/college/work connections include the following:

- Higher education should participate in new and innovative partnerships with schools and private industry.

- Education and business should work together in designing curriculum directly related to workplace needs.

- Using cooperative and apprenticeship programs as models, the classroom should be expanded to take advantage of resources available at work sites.

- Career counseling should be a central component of all vocational programs.

3. Skills Assessment. A key factor in the success of European education systems is the attention paid to relating classroom instruction directly to the skills students need to be productive workers. Educators, employers and labor representatives jointly assess the education and training systems to meet this goal. Because these countries establish performance goals and measure what their students have learned, they know how competent the students are, how productive, how employable and what their potential earning capacity is. These assessments also indicate the quality of programs in which students are enrolled.

The United States has no comparable system. Instead of skills outcomes, national data show the extent to which students proceed through the education systems. SHEEO believes that schools, colleges and employers should define the basic skills needed to succeed in the workplace. The federal Departments of Education and Labor have efforts directed to this goal. These initiatives will engage education, business and labor in tasks to establish job-related, industry-specific skill standards built around core proficiencies. States also are planning strategies to define workforce skills and document successful achievement of skills in certificates of mastery. The foundation for this effort was outlined in the U.S. Secretary of Labor's Commission on Necessary Skills (SCANS) and is being enhanced by the National Advisory Commission on Work-Based Learning (NACWBL).

In summary, changes needed in skills assessment include the following:

- Higher education and its new partners must identify the skills needed in the workplace.

- They must work together to ensure that students have opportunities to learn these skills.

- They must develop assessments that measure what students know and can do.

- Successful achievement of these skills should be documented on certificates of mastery or other credentials for prospective employers and higher education institutions.

4. State Planning and Coordination. Many policies and programs drive vocational education and job training in this country. At the federal level, the Departments of Education, Labor, Agriculture, and Health and Human Services administer programs targeting some form of employment training. State funds supplement or match these programs. Additionally, states have developed their own initiatives targeting economic development. These programs have diverse

fund sources, purposes and targeted populations. They also are implemented by a variety of institutions.

The complexity of the system also is reflected in which agencies administer these programs. For example, in the states, there is typically no single agency with responsibility for secondary and postsecondary vocational education; program administration is divided among a number of different agencies. These can include a department of education; independent board, commission or council; higher education or community college system; office, division or department of higher education; department of vocational/technical education; licensing board; and other agencies.

The problem with this level of diversity is that each program tends to function in isolation. There is little coordination across agencies of program outcomes. And there is almost no collaboration of limited resources. Thus, states and local communities need the ability to focus resources from these multiple sources on a comprehensive workforce preparation plan and strategy.

The SHEEO Committee on Workforce Preparation believes that state agencies, including higher education boards, and local communities will need to work together to coordinate programs, resources and information delivery systems to ensure program effectiveness and successful workforce development.

5. Incentives/Accountability. This country provides few incentives for developing a national quality workforce preparation system. The price tag for quality programs is high. U.S. tax laws do not encourage American companies to invest in training. Outstanding vocational programs seldom are recognized and encouraged.

SHEEO believes that the ability of states and institutions to make needed investments in quality vocational programs will depend on two fundamental changes: internal reform of institutional management to increase efficiencies and new sources of external support. A "customer-first" attitude needs to be incorporated into educational institutions. Learning technologies and self-directed student learning need to be applied to improve quality while cutting labor costs. At the same time, the new investments from all partners — taxpayers, employers and some students will be needed to adequately finance a quality workforce preparation system.

Among the changes recommended are the following:

- Federal and state governments should support new incentives for employers to invest in training.
- Federal and state governments should support greater use of a "contract for services" or "outcomes assessment" funding model.
- State higher education boards should reexamine state tuition and program subsidy policies.

- States and accrediting bodies should find mechanisms for rewarding excellence in vocational and occupational programs.

- Higher education should provide new incentives for rewarding faculty who improve their skills.

PREFACE

The SHEEO Committee on Workforce Preparation was convened in 1991 to examine implications of the national education goals for higher education programs whose primary purpose is workforce preparation and retraining at the occupational/vocational level—programs of two years or less. Our work is based on the belief that a system of high-quality occupational education and training is essential to the nation's ability to respond to today's economic challenges.

Many of our critics believe that U.S. institutions have not kept pace with the changing needs of American industry. They argue that the entry-level workforce does not have the basic skills and flexibility to operate in a changed work environment that requires more individual decision making, critical thinking and team work in small groups. Business leaders lament that the nation's workforce has problems communicating, writing, reading, analyzing materials and carrying out the necessary problem-solving tasks that face a modern, internationally competitive worker.

Higher education coordinating and governing boards do not come to this issue naturally. We often have left "workforce preparation" to others. This is a mistake. Higher education needs to be fully engaged with other partners—the schools, the business community, labor unions and political leaders—in creating a high-quality vocational and occupational system of postsecondary education. In this way we can break down the false dichotomies that often exist between the academic and vocational perspectives.

State political leaders want and need assistance in developing a first-class workforce. Students want jobs and parents want a return on their investment in higher education. We all want a system that opens doors rather than closes them. Too often academic critics of vocational or "workforce-preparation" programs close off debate out of fears that tracking students will result in dead-end jobs with no opportunity for advancement. On the other hand, advocates of European-style systems of education and training fail to recognize the unique virtues of the American system. We believe there is much to learn from the Europeans, but new initiatives need an American twist as well.

Higher education needs to take a hard look at how it is delivering career-level education. This report concentrates primarily on postsecondary programs of two years or less, but there are many lessons for baccalaureate education as well. Preparation for work also needs to be a central ingredient of baccalaureate programs. We envision a high-quality secondary vocational system linked directly to strong occupational programs in vocational/technical institutions and community colleges, which in turn are directly linked to programs in four-year institutions. This is our goal: an education system that expands opportunity, not one that shuts students out.

SHEEO's interest in workforce preparation is a direct extension of a theme that has shaped our work over the past several years—namely, that the education system can and should be viewed as a continuous "pipeline" whose effectiveness depends upon collaboration and partnership with the schools, business community and political leadership. We emphasized this concept in our 1987

and 1990 reports focusing on minority achievement, *A Difference of Degrees* and *Building Coalitions for Minority Success*, and in our 1991 report, *Higher Education and School Reform*.

This report reviews the central problems facing the development of a high-quality system of postsecondary vocational education and training under the following five themes:

- Program quality
- School-college-work connections
- Skills assessment
- State planning and coordination
- Incentives and accountability

It shows how higher education is collaborating with other sectors to create new systems of education and training services. It challenges higher education, through a series of suggested changes, to strengthen its role in ensuring a state's healthy economy by participating in joint partnerships to prepare and retrain a state's workforce, and by helping to develop vocational/occupational programs that link schools, colleges and industry.

Above all, the report is a call to SHEEOs to join state efforts aimed at building a quality workforce. Our commitment to this issue can make a difference for individuals and for state economies.

Diane S. Gilleland, Chair
Director, Arkansas Department of Higher Education

James R. Mingle
Executive Director
SHEEO

FOCUS ON THE WORKFORCE

The economic well-being of the United States and its citizens is in serious jeopardy. The nation's ability to compete in a global marketplace is in doubt. Investments in education are being eroded. The country is in danger of becoming a two-tiered society. Young people with education and skills will find employment and prosperity; those without skills will not.

This theme often has been directed at the elementary/secondary education sector. But it rings equally true to postsecondary education. Two-year and baccalaureate programs play a significant and growing role as part of the workforce preparation network. In particular, the two-year sector has identified one of its primary missions as preparing students for work.

The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 defines vocational education as programs that prepare students for paid or unpaid employment requiring other than a baccalaureate or advanced degree.[1] At the postsecondary level, more than 7,700 institutions offer vocational education. These institutions include community colleges, public vocational-technical schools, private non-profit less-than-four-year institutions, four-year institutions and proprietary schools. Postsecondary vocational education consists of programs leading to pre-baccalaureate vocational awards, most commonly associate's degrees or certificates in programs lasting fewer than two years.[2]

In the fall of 1990, about 6% of the U.S. population, 18-34-years-old, were taking vocational courses. About 43% of those students were taking vocational courses in public two-year colleges. About 19% were taking courses from a vocational, trade or business school. Approximately 10% enrolled in vocational courses in four-year colleges or universities. Only 5% were taking courses provided directly by employers.

A significant percentage of students in postsecondary programs of two years or less are working adults. About 47% of postsecondary vocational students 18-34-years-old were employed full-time. Twenty-two percent were employed part-time. An additional 31% were either unemployed or not in the labor force.[4] Recent Census Bureau data show that more than 44% of students enrolled in two-year colleges are 25 or older; more than 63% of these students are part-time.[5] Many of them are seeking continued education to enter careers or enhance job skills.

Equally compelling data were presented in a recent report by the American Council on Education (ACE), *Financing Nontraditional Students*. Using data from the National Postsecondary Student Aid Study (NPSAS), the authors showed that five times as many nontraditional students are enrolled in public two-year colleges as traditional students. (Nontraditional students are defined as being enrolled part-time, older than 22 years of age, pursuing clock hours rather than credit hours of instruction, financially independent of parents or neither a high school graduate nor GED recipient.) The same ratio applies in proprietary schools. The data suggest that preparation and

training for work is a primary postsecondary educational objective of adult and other nontraditional students.[6]

Data on the educational attainment of traditional-age students (18-24-years-old) also show that while most of these students are pursuing some level of postsecondary education, many are either not completing degree programs or are enrolled in programs of two-year duration or less. For example, this age group completes a median of 12.7 years of education. In March 1991, approximately 64% had completed four years of high school and up to two years of postsecondary education. About 13% completed three or more years of college (Table 1).[7] The National Center for Education Statistics (NCES) reported similar results in its High School and Beyond study. While 18% of those studied had completed a baccalaureate degree within six years after high school, 81% had attained a high school diploma, vocational certificate or associate degree (Table 2).[8]

These figures indicate that American citizens rely on postsecondary education to enhance their skills and improve their opportunities for occupational and economic success. Public higher education often uses this argument to legislatures, businesses and others as a rationale for increased resources and greater public support. However, the rationale will not prove credible if the programs do not meet constituents' needs.

The SHEEO Committee for Workforce Preparation urges higher education to strengthen its role as a leader in creating a world-class workforce. Specifically, the committee recommends the following:

1. Higher education leaders should make quality vocational programs a high priority. Students' basic skills should be strengthened. The programs should be academically rigorous and blend theoretical concepts with practical applications. If this is to be accomplished, then vocational programs can be part of the coursework that may lead students to baccalaureate degrees.

2. Higher education should participate in new and innovative partnerships with schools and private industry. Education and business should work together in designing curriculum directly related to workplace needs. The classroom should be expanded to take advantage of the resources available at work sites. Career counseling should be a central component of all programs.

3. Higher education and its new partners must identify the skills needed in the workplace. They must work together to ensure that students have opportunities to learn these skills. They then must develop assessments that measure what students know and can do. Successful achievement of these skills should be documented on certificates of mastery or other credentials for prospective employers and higher education institutions.

4. State agencies, including higher education boards, and local communities will have to work together to coordinate programs, resources and information delivery systems to ensure program effectiveness and successful workforce development.

5. Finally, public higher education must support new incentives for employers, institutions and faculty to help ensure involvement, resource investment, quality program development, and change and improvement in instruction.

Table 1

Years of School Completed
by Persons Ages 18-24
March 1991

(Numbers in thousands, noninstitutional population)

Total Population	0-8 Years School	1-3 Years HS	4 Years HS	1-2 Years College	3-4 Years College	5+ Years College
24,901	977 (4%)	4,499 (18%)	10,549 (42%)	5,579 (22%)	3,103 (12%)	285 (1%)

Source: U.S. Department of Commerce, Bureau of the Census (May 1992)

Table 2

Percentage of High School and Beyond
1980 Seniors Who Earned Degrees After High School
Third Follow-up
(1986)

No HS Diploma	HS Diploma	Certificate	AA/AS Degree	BA/BS Degree
.92	61.8	11.9	6.46	18.18

Source: National Center for Education Statistics, U.S. Department of Education, Office of Educational Research and Improvement (April 1989)

PROGRAM QUALITY

Problem: In too many instances, vocational and occupational programs suffer from outdated curriculum more relevant to the 19th century than the 21st. Students enter the programs poorly prepared and with low expectations. Programs too often are targeted at low-wage service employment. If American employers are to be competitive, they will need a more highly trained workforce, especially in the areas of science, technology and mathematics.

The National Assessment of Vocational Education (NAVE) has found that four main factors predict program quality: (1) the intensity of program instruction, (2) the integration of theoretical and applied aspects of vocational instruction, (3) the presence of active links to employers and others in the profession and (4) the quality of the job-placement assistance provided to students.[9] But the absence of these quality features in many postsecondary vocational-technical programs is a central problem—especially the lack of attention paid to basic skills development. For example, NAVE studies also show that institutions vary widely in their course offerings and in the balance between an academic and vocational curriculum. Students in proprietary schools and technical institutes take about 70% of their coursework in vocational fields. The National Center on Education Statistics reports that overall, only two-fifths of all credits earned by vocational associate of arts (A.A.) degree recipients are in academic subjects.[10]

States are finding that students in many of these programs do not have the level of computation, communication and analytical skills necessary for today's highly technical workplace. For example, a Florida assessment of vocational preparatory programs authorized by the Florida Postsecondary Planning Commission identified students' basic skills deficiencies as a major problem. The study found that although secondary vocational programs in Florida's public schools require certain general education coursework, students still lacked the academic skills needed to be successful in the workplace. Many students enter postsecondary vocational programs lacking basic skills in reading, writing and mathematics. The problem is compounded because many colleges and most school district area vocational centers do not require students to correct basic skill deficiencies prior to commencing vocational courses. And, while the state requires that these weaknesses be corrected before a certificate is issued, a student may enter the workforce without reaching a basic skill level in fundamental academic areas.[11]

A North Carolina study came to a similar conclusion. It found that many high school students in the vocational track enrolled in courses indiscriminately, without a specific academic or career goal in mind. Upon graduation, these students enrolled in trade or technical schools with

inadequate backgrounds in mathematics, science, communications, basic principles of technology or business.[12]

What is reported in these states is typical across the country. Students enter vocational-technical programs with limited basic skills and often leave the programs without ever making up the deficiencies.

Persons completing the programs do not always reap the rewards they may expect. Recent Census Bureau data show that during the 1980s, persons with vocational-technical credentials or with only high school diplomas experienced no real increase in monthly earnings. Persons with some vocational training had average monthly earnings slightly higher than those with only a high school diploma ($1,088 v. $921).[13] NAVE also found that the degree to which students benefit from vocational training depends on the amount of training received and the coherence of the program taken. Students with limited training have poorer labor market outcomes. Also, vocational training dispersed among many fields adds little to the student's prospects for employment or job placement in a field related to the training.

Needed Change: The skills needed by students pursuing occupational programs are no different from those needed by students pursuing academic programs. Both are basic. What may differ is the method of instruction and the structures that link secondary and postsecondary programs.

In recent national reports, in the popular press, among political and business leaders, the message seems to be the same: to improve workforce productivity, there must be stepped-up emphasis in teaching students and adult learners the basic academic skills of reading, writing and computation at all levels of formal schooling and in all human resource development settings.[14]

This was a central recommendation of a state-level study in Illinois. The Illinois Committee to Study Preparation of the Workforce, a group convened by the state's Board of Higher Education, urged that "the Board of Higher Education, the State Board of Education and the Illinois Community College Board, colleges and universities, and elementary and secondary schools ensure that the development of basic skills is the first priority in preparing students for work as well as for further education." The committee also suggested that "[i]n teaching basic skills, postsecondary institutions stress the application of these skills in the workplace so that skills are not viewed by students as abstractions, but as tools for problem-solving in employment settings."[15]

Basic skills development is also the focus of a recent initiative sponsored by the Southern Regional Education Board (SREB) called the SREB-State Vocational Education Consortium. The project goal is to improve the communications, science and mathematics competencies of students pursuing secondary vocational studies. Gene Bottoms, project director, reports that closing the

gap between vocational and academic education requires forging academic and vocational courses into more challenging and rigorous programs. "This strategy serves the dual purpose of preparing a greater number of youth more adequately for meaningful employment and for success in postsecondary education," he says.

SREB reports that basic competency achievement will increase if more secondary vocational students enroll in either college-preparatory courses or in more rigorous applied courses designed to teach college-prep content. The board suggests that secondary vocational education personnel must agree that the purpose of secondary vocational education is to prepare youth for lifelong learning in either a work or educational setting. Higher expectations, more rigorous course content and the reinforcement of academics in the vocational curriculum can help increase the basic competency achievement of vocational students.[16]

Applied Academics: The Foundation of Tech-Prep

Increasing the competency and academic skills of students in vocational-technical secondary and postsecondary programs calls for rethinking and redesigning education and training systems. This may be in the form of "2 + 2 + 2" tech-prep programs, apprenticeship programs or other comprehensive career and workforce training systems that prepare students to succeed in changing work environments.

The tech-prep associate degree (TPAD) program, developed jointly by two-year colleges and high schools, is an academic program that works alongside the college preparatory/baccalaureate degree program.[17] It emphasizes preparation for the middle range of occupations requiring some postsecondary education and training, but not necessarily a baccalaureate degree. The program combines a common core of applied academics (mathematics, science and communications) with the specifics of advanced-skill technical education. Beginning with junior year in high school, students continue for four years with a structured, closely coordinated program, first in high school then in community or technical college. They end up with an advanced-skills associate degree that either prepares them for entry into a whole host of new jobs or allows them to continue their education in a baccalaureate degree program.[18]

The architects of this program, Dan Hull, president of the Center for Occupational Research and Development and Dale Parnell, Commissioner of Community Colleges in Oregon, in their book *Tech Prep Associate Degree: A Win-Win Experience*, illustrate one example of how tech-prep is working in Richmond County, North Carolina. The county conducted an assessment of its economy in 1985 and concluded:

> If Richmond County is to prosper 10, 20 and 30 years into the future, its workforce will have to be far better trained and educated than it is today. In addition to assuring that students graduate, public schools must work to assure school-to-work transition programs. Too often students leave high school with a diploma, but without a job or any plan to continue their education in college or vocational training. Students must be

encouraged to plan ahead. A new ethic that education is a 14-year process must be instilled and increased linkage should be established between public schools and community and technical colleges.[19]

As one of its first steps toward creating this continuous education and workforce preparation system, the county developed a tech-prep program with strong academic requirements and upgraded, contemporary vocational/technical courses. Program planners considered the local economy's changes from traditional manufacturing to computerized technological processes, entrepreneurship and service occupations. They concluded that a heavy concentration on job-specific skills in high school was ill-advised and placed more importance on better communication and mathematical skills, a better understanding of applicable scientific concepts and a basic understanding of technological principles, coupled with appropriate hands-on experience. This, they asserted, would better equip students with skills to survive in a rapidly changing job market.

The curriculum is designed so that students enrolling in the four-plus-two program begin with academic coursework in 9th grade and finish six years later with a tech-prep associate degree. All students in the program are required to take the same core of academic courses (algebra, geometry, English, biology, physical science, government and economics, and U.S. history). Depending upon the area of concentration (engineering technology, business/entrepreneurship or health/human services), additional academic courses may be required. For example, health/human services programs require additional science courses. Cosmetology students are required to take chemistry. Students in technical health occupations must take both chemistry and anatomy/physiology. Vocational/technical courses also begin in the 9th grade. These courses emphasize development of computer proficiency, an understanding of scientific and mathematical principles and higher order thinking skills.[20]

Although piloted only in a small number of communities, North Carolina predicts that within the next year or two, 100 of the 134 local school systems and 44 of the 58 community colleges will be at some stage of involvement with the tech-prep associate degree program.[21]

Two sections of the Carl D. Perkins Vocational and Applied Technology Act of 1990 support the development of tech-prep programs. One section provides funds to states to help them develop tech-prep education systems. The states are to use these funds to allot competitive grants to consortia of schools and postsecondary education institutions to develop and operate four-year tech-prep programs that lead to a two-year associate degree or a two-year certificate. One purpose of the grants is to ensure systemic development of "strong, comprehensive links between secondary schools and postsecondary educational institutions."[22]

Another section of the act provides a source of support for states and others to develop applied academic programs. The act authorizes basic grants to postsecondary institutions, secondary schools, state education boards and others to develop, implement and operate programs using different models of curricula that integrate vocational and academic learning. Recipients (1) design integrated curricula and courses, (2) provide inservice training for teachers and administrators in integrated curricula and (3) disseminate information regarding effective integrative strategies.[23]

Articulation: A Systemic Approach to Quality Vocational Education and Training

In addition to integrating academic courses with vocational training, tech-prep programs also provide students a logical progression of skills development and training between secondary and postsecondary education. Within this context, articulation is the process by which education policies and practices are coordinated to produce a smooth flow of students from one sector to the next and from education to the workplace.[24] For tech-prep programs, this includes designing sequential curricula that eliminate unnecessary duplication of coursework. It also includes providing students with achievement benchmarks in the form of certificates and/or degrees.

These features are being incorporated into some state school reform efforts. For example, Oregon's Investment in Workforce Quality is a statewide effort to create a comprehensive education and workforce training system. Its goal is "to produce the best educated citizens in the nation by the year 2000 and a workforce equal to any in the world by the year 2010." The central focus of the initiative and the key to quality control is the introduction of the Certificate of Initial Mastery (CIM) and the Certificate of Advanced Mastery (CAM).[25]

The CIM is a standard of achievement a student earns around the 10th grade or age 16. It is founded on a series of performance-based assessments at grades 3, 5, 8 and 10 documenting a student's progress in mastering academic subjects such as English, mathematics, science, geography, history, foreign language and the arts. Students also are required to be proficient in critical-thinking, problem-solving and communication skills. The CIM leads to a number of education and training options, including entry into a work-based learning program, a tech-prep/associate degree program or a college prep/baccalaureate degree program. Built-in flexibility permits students to move back and forth between options leading toward college, the workplace or a combination of the two. The CIM is supposed to be available for every Oregon student by spring 1997.

Upon achieving the CIM, the student may select a career path leading to a CAM with either a college preparatory or an academic/professional-technical endorsement or both. The CAM involves at least two years of study or work combined with study. It provides students options to go directly to work, combine work and continued study through an apprenticeship or community college program, pursue an associate degree or enter into a baccalaureate degree program. In addition to establishing the foundation for college preparation, students may earn a CAM in at least six broad occupational categories of academic professional-technical endorsements. The CAM will be available to students in fall 1997.

As in other states, Oregon Department of Education officials are working on ways to connect the TPAD program more directly with university baccalaureate programs. A central concern is developing applied academic courses that meet the standards that will allow students to enter baccalaureate programs. When this is overcome, the system will allow students opportunities to complete the TPAD and enter a baccalaureate degree program with junior status. It also will ensure that high school and community college students will not be caught in a dilemma of selecting

between two tracks—vocational or college-prep—but will have opportunities for extended education no matter which curriculum path they choose.

A similar goal is part of Florida's Blueprint for Career Preparation—a comprehensive effort aimed at strengthening employability skills and providing the necessary counseling and guidance opportunities to ensure that high school students are prepared to begin a career or enter a postsecondary institution. The Blueprint stresses that vocational and academic training must be integrated through six steps.

1. Begin in kindergarten and continue through 5th grade to develop in students an awareness of self, the value of work and exposure to careers in technology.

2. By grade 6, students—with the help of their teachers and parents—should assess personal aptitudes, abilities and interests, and relate them to careers. They also should learn the role of technology in the world of work.

3. In grades 7 and 8, students should set career-oriented goals and develop four-year career plans for grades 9 through 12. These plans may change as they are reviewed annually, but they set students on a course and provide a basis for curriculum selection.

4. During high school, a new "applied curriculum" will make academic concepts relevant to the workplace, especially in communications, mathematics and science. Vocational courses are coordinated with academic instruction.

5. After graduation from articulated secondary/postsecondary education programs, students should be able to gain employment, advance within their fields or change occupations. These programs, which begin in high school, are completed at vocational-technical centers, community colleges and universities.

6. Educators should intensify efforts to share information and to involve parents, businesses and the entire community in this process.

SCHOOL/COLLEGE/WORK CONNECTIONS

Problem: The American system of secondary and postsecondary education often is disconnected from the world of work. The nation's commitment to the education and training of non-college-bound students is limited. Many students are unable to relate curriculum to their future goals in the workplace. Career counseling is neglected. The result is often high dropout rates at both the secondary and postsecondary levels.

This country has no common agenda for human resource development. Instead of considering workforce development as a single system of learning that serves individuals beginning at preschool and continuing throughout their careers, the United States compartmentalizes phases of learning by various education and training providers (e.g., K-12, two-year postsecondary, four-year postsecondary, employers and military).[26] Each operates separately.

SHEEO has voiced this concern in relation to the need to increase minority student achievement and success in higher education and to the importance of systemic delivery of education services through school-college partnerships. But, while there are significant gaps in learning and counseling services for college-bound students, an even wider chasm exists for students not planning to pursue a four-year college degree. U.S. commitment to the education and training of non-college youth is limited; expectations for their future are lower.

The costs for such inadequate attention to this population are high. A recent U.S. General Accounting Office (GAO) report studying this issue states:

> The [individual unprepared for work] forgoes considerable earnings over a lifetime while contributing to lagging national productivity growth and social welfare cost increases. One year's cohort of high school dropouts and deficient high school graduates may forgo an estimated $150 billion to $300 billion in earnings over their lifetimes, or about $135,000 to $300,000 per individual. In addition, the government is likely to incur increased expenditures to address social problems, such as crime, drug abuse, prison and welfare, estimated conservatively at $10 billion. To what extent these losses can be recouped through increased investment in education and training is unclear; however, that significant costs will be incurred because of an ill-prepared work force is indisputable.[27]

In contrast, the increased commitment by other countries to non-college-bound youth is aimed at ensuring that there is a clear transition from school to work.[28] Students know and understand what they can expect during and upon conclusion of their education. Programs are made up of sequential courses that integrate theoretical and academic instruction with practical application. The Com-

mission on the Skills of the American Workforce analyzed European systems and concluded that successful systems all had the following features:

- Study is provided in a wide range of occupations across industries, from auto repair and construction to food service and banking.
- Education generally combines school and work-based learning, and participants spend a certain portion of their studies training on the job.
- Companies and unions provide workplace training and maintain strong connections with the schools: some firms in Sweden and Germany have set up their own schools to attract highly qualified prospective applicants.
- Representatives from relevant industry councils and unions design national standards for the programs, certify training providers, assess performance and certify completion.
- Students are assessed in performance-based and written examinations. Those who meet industry standards are recognized as skilled workers in the trade.[29]

The result is that "employers, knowing that students who graduate from the system have the skills they seek, are glad to hire them. Students, seeing a direct relationship between school and work, are motivated to learn."[30]

The United States needs to create a distinctive American paradigm for educating and training citizens for productive work and careers. If students are going to achieve the skills necessary to be successful in the workplace, employers need to be involved. But, adopt-a-school initiatives are not enough. Business and industry must work with education to communicate what is needed on the job and put that knowledge into the curriculum and instruction. The model should redefine the nature of the classroom—expanding it beyond the campus into the workplace. Career counseling should be integrated into every program with information about the skills needed to succeed on the job given to students early and often.

Needed Change: State and local business leaders should be primary partners in curriculum design.

Business and industry can play a significant role in connecting students' educational experience in schools, colleges and the workplace. One way is by using their expertise to promote change in schools and colleges. For example, the IBM Corporation has developed an agenda to improve learning in the 1990s by sharing its expertise in computer technology and applications with schools and colleges. IBM sees its role as "fostering networking between institutions," says Larry McKinney, application solutions director, Academic Information Systems. The company works

with faculties to create a technology-literate environment within schools and colleges. For example, it assists community colleges in setting up centers for faculty support. Housed in numerous community colleges, the centers help faculty use technology in the classroom. The IBM visiting scholars program brings company experts into the classroom. Additionally, school and college faculty are invited to attend annual conferences that highlight new technologies and programs. IBM also funds special projects to enhance human potential. For example, Project Synergy is a $1.3 million program focusing on teaching and improving computer literacy skills of underprepared students.[31]

Employer involvement is an important part of the Texas Quality Workforce Planning initiative, a tri-agency initiative composed of the Texas Education Agency, Higher Education Coordinating Board and Department of Commerce. This effort has resulted in 2+2 programs targeting occupations identified by regional employers. For example, in El Paso, school districts, El Paso Community College and Western Technical Institute have created an integrated curriculum in medical technology, drafting/design technology and micro-computer technology. In response to regional employer requests, the Waco, Texas, school district requires that all students complete coursework in algebra I and geometry before graduation.[32]

Active employer participation is a cornerstone of the Arkansas Department of Higher Education's Center for Workforce Excellence. Created in 1992 in a special legislative session, the center's goals are to improve worker skills through high-level technical training and education. An advisory board made up of representatives of postsecondary education, public high schools, the state's industrial development agency, private industry and labor, and other appropriate organizations assists the department. In a pilot effort, the center will work with a new aerospace company, Ouachita Technical College and Henderson State University in developing curriculum and training for the company's workforce.

Recognizing a need for highly skilled automotive technicians, the New Hampshire Automobile Dealers Association in 1986 established an education foundation to encourage and support partnerships between automobile dealers and manufacturers and secondary and postsecondary education in the state. A recent cooperative venture that teamed the foundation and the state Department of Postsecondary Technical Education with General Motors Corporation, Ford Motor Company and Toyota Motor Sales USA resulted in an investment of over $1 million to develop automotive associate degree and technician training programs.

One of these, the Automotive Student Service Educational Training (ASSET) program sponsored by Ford, offers a two-year associate degree in automotive technology at New Hampshire Technical College in Manchester. Students earn their degrees working exclusively on Ford Motor products. Throughout the two-year duration of the program, students alternate eight weeks of college studies and eight weeks of cooperative experience at a sponsoring Ford dealership. Additionally, they earn wages which more than offset the costs of the college education. The industry-education sponsors claim that graduates will have the highest level of automotive training in the latest technology and will be ready to assume a productive role in a Ford dealership.[33]

A few local secondary vocational-technical programs offer models for involving industry in curriculum development. For example, a program at the Trezevant Vocational Technical Center in Memphis, Tennessee, prepares students for occupations in the chemical industry. It is a three-year curriculum packed with mathematics and science for which students receive academic credits toward a high school diploma and direct hands-on laboratory experience. Faculty at Trezevant developed the curriculum with industry and academic representatives and coordinated it with the academic high school curriculum. Students in the program spend a half-day in the technical center and a half-day in the high school, where they study English, mathematics and other academic subjects. After high school, students either obtain employment or continue their science education in college, often at employer expense. Representatives from eight companies that use chemistry-based technicians sit on an advisory panel for the program.[34]

Needed Change: Education at both the secondary and postsecondary levels should incorporate apprenticeships and cooperative types of experiences in the curriculum.

Cooperative education and apprenticeship programs developed among business, labor and educational institutions provide invaluable benefits to students, employers and institutions.[35] The programs expose students to technology, equipment and procedures often not available in the school/institution or within the expertise of the faculty. A recent GAO study on school-to-work transition programs reports that quality cooperative and apprenticeship programs aid students in developing occupations and finding meaningful employment. High percentages of students in the schools and institutions received permanent job offers from their co-op employers.[36] Similarly, students in quality apprenticeship programs were offered skill certification upon completion. Because programs are registered and often employ industry-recognized standards, these certificates are portable both within and across states, GAO says.

Employers involved in these education programs report that cooperative and apprenticeship students are a good source of permanent employees. The programs enable employers to address their need for skilled workers by accessing a new pool of labor from which to recruit. For schools and institutions, the programs help improve student retention and recruitment. Additionally, cooperatives and apprenticeships are credited with improving vocational curricula by giving schools and institutions increased knowledge of employer needs.[37]

Yet, these programs are not well-used in this country. Today, apprenticeship programs are centered primarily in the traditional trade jobs such as carpenter, electrician, plumber, sheet metal worker, machinist and tool and die maker. Nationally, there are only 300,000 registered apprentices—a number that has not grown for more than 10 years. As a percentage of the total civilian labor force, apprenticeship enrollment represents less than .3%.[38] Unlike the European program, apprenticeship in the United States is not a program for young people. The average age of U.S. apprentices

is 29. Here, school-to-apprenticeship programs that provide high school students, primarily seniors, with apprenticeship training are limited, involving no more than 3,500 students.[39]

Similarly, relatively few youth participate in high school and community college cooperative education programs. About 8% of high school juniors and seniors participated in co-ops in the 1989-90 school year, with enrollments concentrated in marketing, trade and industry, and business. Less than 3% of community college students were enrolled in co-ops during that period.

Fortunately, these programs are being reconsidered as models for enhancing quality workforce education and training. And the compelling evidence that these efforts work is influencing new program development. For example, at the national level, the Council of Chief State School Officers and the Pew Charitable Trusts last year created a state-level competitive grant program called "New Career Paths Through Youth Apprenticeship." The purpose of the grants is to support exemplary efforts to develop systems of youth apprenticeships. In the first round of competition, 10 state education agencies were awarded grants to design and develop apprenticeship systems.[40] In the second round, five states (California, Maine, Minnesota, West Virginia and Wisconsin) were awarded funds to extend their efforts to build or improve youth apprenticeship systems.[41]

Comparable efforts are being considered at the federal level. For example, the proposed National Youth Apprenticeship Act of 1992 would allow youth apprentices to complete a high school diploma, earn a certificate of competency and qualify for a postsecondary program, a registered apprenticeship or employment.[42]

Needed Change: Counseling and job information should be upgraded.

Students in vocational education programs are left largely on their own to chart their occupational and career futures. In schools and postsecondary institutions, they receive little information about which courses would provide the best preparation for what will come after their vocational education programs end; there is little connection made between school and work. Counselors, teachers and institutional faculty often do not have access to information about career choices or continued training opportunities for students. Nor are they adequately trained to interpret assessment data related to skill levels and occupational interests.

Traditional career awareness programs no longer meet today's demands for quality workforce preparation. The current focus on increasing workforce skills require that career awareness and counseling programs be built into statewide approaches to help students prepare themselves academically and assess their vocational and career interests. For example, at the University of Montana, the American Indian Science and Engineering Society runs an electronic bulletin board designed to encourage American Indian secondary and postsecondary students to study science and engineering. The bulletin board provides tips for getting into college, details about available scholarships and information on conferences. It helps students find jobs by posting their resumes in a special file available to employers.

The Kentucky Council on Higher Education and the Kentucky Association of Electric Co-operatives have developed a resource guide to help middle and high school counselors and teachers advise students on postsecondary education options and career exploration. *Futures: Your Guide to Life After High School* provides comprehensive information on such areas as how to make curriculum choices for vocational-technical education as well as pre-college programs (or combinations of the two), how to develop a career plan including self-assessments and descriptions of occupational interest areas, and how to plan for continued postsecondary education and training. The guide is not intended to be used in isolation; counselors are encouraged to use it as part of group and individual support services to help students chart career courses.

Although *Futures* was developed before the recent Kentucky school reform initiative, the Kentucky Council on Higher Education reports that it has become a valuable complement to the reform agenda. The state's colleges of education also use it as a resource in counseling courses for future teachers and counselors.

A major component of the Richmond County, North Carolina, tech-prep program, discussed in the first section, is the emphasis on career guidance.[43] Each junior and senior high school is equipped with a computerized career guidance center. Students use computers to conduct interest inventories on themselves, conduct a job or occupational search or look for a college. A career guidance file is kept on each student in grades 7 through 12 to maintain information on achievements, interests, aptitudes, and academic/career goals.

Career exploration units are taught in the 7th and 8th grades to expose students to both the opportunities and the skill requirements (academic and technical) of the various occupational clusters. Prior to pre-registering for 9th grade courses, students choose a course of study—pre-college, tech-prep or general academic/vocational—with parental approval and signature. Students are locked into these choices for only one year at a time. Before each new year, students may change their course of study according to their career focus and/or academic achievement the previous year. These choices are made only after extensive counseling sessions involving guidance counselors, teachers, administrators and employers. Executives from local businesses and industries meet annually with groups of students in grades 8-11 to inform them of changes occurring in the workplace, job entry requirements, academic and vocational/technical skills needed and job opportunities.[44]

In some states, comprehensive programs help secondary and postsecondary teachers and counselors advise students of career and vocational training opportunities. For example, the Florida Career Education Act provides preservice and inservice training to school and postsecondary faculty and counselors on designing integrated curricula; promoting career counseling, placement and follow-up; and developing partnerships with business and industry, community-based organizations and government agencies.

In Illinois, the Board of Higher Education's Committee to Study Preparation of the Workforce recommended that secondary and postsecondary vocational faculty and counselors be kept current

on the needs of employers. One suggestion is to encourage faculty to participate in business-based internships and training programs. Another suggestion is to improve counselor preparation by expanding their contacts, including on-site observations, with private-sector employers.[45]

Also in Florida, the Division of Vocational, Adult and Community Education and the State Board of Community Colleges developed a number of computer software programs that support career guidance and career counseling for students in public schools and community colleges. For example, the Computerized Heuristic Occupation Information and Career Exploration System (CHOICES), is a computerized information and guidance system designed to enhance self-assessment, career planning and decision making. CHOICES contains information on more than 1,000 occupations as well as on Florida's 600 postsecondary institutions and 10,000 postsecondary education programs of study. The program focuses on careers, counseling, financial aid and placement.[46] Counselors and occupational specialists use CHOICES to provide students and clients with up-to-date information so they become aware of their career needs, how much training is needed for a particular job, where training is available, courses of study and appropriate financial aid awards. The CHOICES system also is used in Missouri, and similar programs are being developed and used in other states.

While career counseling is considered vital, it still is not well integrated into state workforce preparation plans. For example, in Florida, the Bureau for Career Development reported that while 45 school districts had individual student career plans in 1988-89, only two districts had a comprehensive career development program.[47] Much has been accomplished since then. In 1991-92, 53,000 Florida 8th graders completed individual career and educational plans, and 27 districts developed comprehensive guidance plans.

One reason often cited for poor counseling is that counselors, teachers, parents and others view vocational-technical education programs as dumping grounds for students who cannot succeed in regular college-bound academic programs or those who have behavior problems. Parents and guidance counselors are reluctant to guide students into vocational-technical programs because they do not perceive them as options that lead to future success. The opposite occurs for college-prep programs for university-bound students. But this image should change as this country comes to value education for work as a necessary endeavor and workers as respected national assets.

SKILLS ASSESSMENT

Problem: Unlike many countries with whom the United States competes, this nation has relatively little concrete information on the knowledge and skills acquired by graduates of postsecondary education and training systems. Basic skills of high school graduates often are not assessed upon entry to college; nor are the outcomes of the postsecondary experience assessed. In most occupational fields, national industry-wide standards do not exist.

A key factor in the success of European education and workforce training systems is the attention paid to ensuring that what is presented in the classroom is related directly to the skills one needs to be a productive worker. Partnerships of educators, policy makers and employers jointly assess the education and training systems to meet this goal. A recent Council of Chief State School Officers study shows that in Germany, for example, interim and final student examinations are organized and conducted by examination committees composed of representatives of industry, employee groups and educators. The interim exam is given for assessment purposes only, i.e., to provide information on the youth's progress and identify gaps and needs in instruction. It is not used as a barrier to further study.

The final examination determines whether the trainee has acquired the theoretical and practical knowledge agreed to jointly by the government and employer-trainer. It also determines whether the basic education received in the vocational school supports the knowledge needed for the trade. For instance, students in electrical mechanics are tested in mathematics, technical drawing, technology and social science. They also must demonstrate knowledge in project planning and the ability to recognize, analyze and solve planning problems in "real-life" work situations.[48]

Unlike the U.S. high school diploma (which some contend is more evidence of staying power than of academic achievement), the credentials earned by European vocational students have significant meaning to everyone.[49] Upon completion of the formal education process, students have a documented work record that is nationally recognized, portable and competency-based. For example, the Danish certificate provides students union membership, an unemployment allowance or wages at regular workers' scale. The German apprenticeship certificate is the credential of a fully accomplished adult in society—demonstrating work readiness and a commitment of work and study.[50]

These credentials give the holders options for occupational as well as educational development. They are exchangeable for continued employment with a training firm, for entry to another firm in the same trade or profession or for continuation to higher education, training or retraining for another field. Proponents also claim that students with university degrees often seek appren-

ticeship training as a way of acquiring up-to-date technical training not otherwise attainable and to ensure their grounding in practical experience.[51]

In short, countries that have strong economies evidenced by high levels of production also demonstrate a systemic approach to how they assess the education and workforce training provided to their citizens. Assessment in the European context is very occupation- or trade-specific. It begins with high standards and skills defined by industry and business and is presented to students in sequenced training. Because these countries establish performance goals and measure what their students have learned from the earliest grades through adulthood, they know how competent the students are, how productive, how employable and what their potential earning capacity is. These assessments also indicate the quality of the programs in which the students are enrolled.

The United States has no comparable system. Rather, work-readiness skills tend to be broadly-defined and reflect a general population. An example is a 1986 study of adult literacy by the National Assessment of Educational Progress (NAEP). While not specifically targeted at assessing workforce skills, the authors suggest that the data and analysis have grave implications for the skills of entry- and mid-level workers. The study shows that the majority of young (ages 21 to 25) American adults examined could not perform such moderate or complex tasks as orally interpreting a lengthy feature story in a newspaper or determining correct change using a menu. Less than half of the adults studied who had attended 9-12 years of high school demonstrated proficiency in writing a letter explaining an error on a credit card bill. Less than 50% of those with a high school diploma and/or some postsecondary experience could locate information in a news article.[52]

Instead of skills outcomes, U.S. national data tend to reveal the extent to which students proceed through the education system. For instance, a recent national study conducted for the Department of Education by Research and Evaluation Associates (REA) surveyed states to learn how they assess student outcomes in postsecondary vocational programs. The purpose was to determine the extent to which assessment of performance outcomes is used by state policy makers to measure program quality and motivate program improvement. The study concluded that although a majority of states have undertaken limited activities to assess performance outcomes, most have difficulty in analyzing the data they collect or in using it for program improvement or policy development.[53]

The study showed that almost all states collect at least some information about program outcomes. The reasons vary: to make decisions about state funding, to expand or contract programs by occupation or to determine the need for corrective action or for consumer information. The most frequently collected outcome measure is the number of students who complete a training program (found in 46 states for public postsecondary vocational education programs and 29 states for proprietary schools). The next most frequently collected measure is the level to which program completers are placed in jobs (33 states for public institutions and 32 states for proprietary schools). Most states attempt to determine whether the job placement is related to the training provided, although this practice is much less common for proprietary schools than for public institutions. A

small number of states measure outcomes such as earnings, gains in basic skills and job knowledge, and results from state licensing exams.

However, the REA report cites critical limitations to this collected information. Significant numbers of students who participated in postsecondary vocational education programs go undetected because many states only count students who complete programs, and they differ in how they define "program completer." For example, in some states a program completer is defined as someone who receives an associate's degree: students who obtain diplomas or certificates are not included. Similarly, many states that collect data on job placements also count "program completers" only. Another problem is the method states use to collect information. For example, the most common means for determining whether placement is "training related" is for students themselves to report that their employment is related to the training they received. Thus, the data are unreliable on various grounds (i.e., they are limited to the students who respond to a survey or vulnerable to inconsistent interpretation).[54]

In another recent study conducted to assist implementation of the Student Right-to-Know and Campus Security Act, the National Center for Education Statistics (NCES) examined the availability and utility of student outcome statistics collected by postsecondary institutions.[55] One part of the survey explored institutional capability for reporting such outcomes as employment status and license and certificate gains. Eighty percent of all institutions reported being able to determine employment outcomes for graduates. A significant majority (over 75%) of public and private nonprofit two-year and less-than-two-year institutions reported this capability. Most postsecondary institutions that provide vocational training claim they can also determine if their graduates obtained necessary licenses or certificates.[56]

However, as with the REA study of state-level data-collection efforts, NCES identified several problems related to the quality and accuracy of this collected data.

- Use of graduate surveys to assess post-completion outcomes (such as training-related employment, earnings or licensure) are generally unreliable. They may be biased as well since response rates to these surveys are fairly low and there is little information on the characteristics of non-respondents.

- Definitions of critical terms are inconsistent among institutions and institutional sectors nationally and within states that have different reporting requirements for different institutional sectors.

Rather than assessing specific outcomes—showing what students know and can do—the nation continues to ask for and collect indirect measures of student achievement. Basic skills assessments to determine minimum competency levels and preparation for entry into postsecondary programs are geared more toward the college-going population than students in postsecondary vocational education programs. The REA survey shows that a small group of states have elected to include gains in basic skills or in the skills specific to an occupation as measures of performance for their

public vocational institutions. Few states gather information on gains in basic skills using standardized tests administered prior to enrollment and prior to completion. Only six states reportedly collect information about gains in job skills. No states reported collecting such measures for students attending proprietary schools in programs for occupations other than the licensed trades.

Florida, one of the states collecting data on basic skills, requires one type of basic skills assessment for students in vocational certificate programs and another type for degree programs. For example, students who enroll in a postsecondary adult vocational program of 450 clock hours or more are required to take a written entry-level basic skills examination.[57] Any student who does not meet a minimum competency level as demonstrated by the exam must enroll in vocational preparatory instruction. Students are retested after program completion. They cannot receive a certificate of vocational program completion until they demonstrate mastery of basic skills.

Vocational students entering a degree program at Florida public community colleges or state universities also are tested on basic computation and communication skills.[58] Students scoring below a determined minimum level are required to enroll in a remedial program.

Needed Changes: (1) Schools, colleges and employers should define the basic skills needed to succeed in the workplace. (2) Higher education should support the development of an expanded set of national occupation- or industry-specific skills standards. (3) Successful achievement of these skills should be documented on certificates of mastery and/or other credentials for prospective employers and higher education institutions.

The study of European models conducted by the Council of Chief State School Officers suggests several lessons for U.S. education systems:

1. Improving methods for determining skills necessary for success in the workplace

2. Assuring that curriculum and instruction support this knowledge base

3. Assessing students' general knowledge and mastery of these skills

4. Rewarding student mastery

The council reports that because European businesses and labor actively participate in training and credentialing for the workplace, they directly influence the numbers of young people receiving training in a trade or profession and systematically develop the personnel resource needs of a career area or industry.[59]

National Efforts To Assess Workforce Readiness

A course of action to assess student skills may be developing in the United States under a number of efforts. Most recent initiatives are fueled by the National Education Goals developed in 1989 by the nation's governors and the president. Goal 5 focuses on workforce preparation—lifelong learning and adult literacy. It states:

> By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

The National Education Goals Panel, created in 1990 and made up of governors, members of Congress and administration officials, reviewed national data showing student performance related to the five goals. For Goal Five, the panel concluded that virtually nothing exists on either the national or state level to provide information about the knowledge, skills and attitudes of American workers in comparison to workers in other countries. The panel is studying the feasibility of developing two new assessments: (1) an international comparative assessment of workforce knowledge, motivations and skills and (2) a national assessment of college students' thinking, communication and problem-solving skills.[60] In August 1992, a task force (which included state higher education executive officers) advising the National Goals Panel concluded that a sample-based assessment of college graduates' ability to think critically, communicate effectively and solve problems should be developed.

The Goal 5 Technical Planning Subgroup also has recommended to the Goals Panel that the U.S. participate in three planned international studies. Information from these studies would compare workforce skills of Americans with those of workers in a number of other countries. For example, the Survey of Worker Training sponsored by the World Bank will survey 400-500 manufacturing companies (and a sample of their employees) in Japan, Singapore, Korea, Mexico, Colombia, Malaysia and India. The study will investigate factors influencing firm and worker incentives to train and productivity outcomes of training investments. The International Study of Adult Literacy sponsored by the Educational Testing Service and Statistics Canada will assess literacy skills of adults in six countries: Germany, France, Canada, Mexico, Japan and the United States. And, the Organization for Economic Cooperation and Development (OECD) is planning a comprehensive cross-national study designed to show the data collection and reporting practices in different industrialized countries.[61]

Another initiative driven by Goal Five and America 2000 (the president's strategy for achieving the goals) is the Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). SCANS developed a framework for skills necessary for entry-level employment. In its initial report, *What Work Requires of Schools*, released in 1991, the commission used the phrase "workplace know-how" to define essential preparation for all students (those going directly to work as well as those planning further education). "Workplace know-how" identifies "five competencies and a three-part foundation of skills and personal qualities that lie at the heart of job performance."[62]

The competencies SCANS suggests are necessary for effective workers include:

- Resources: allocating time, money, materials, space and staff
- Interpersonal skills: working on teams, teaching others, serving customers, leading, negotiating and working well with people from culturally diverse backgrounds
- Information: acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information
- Systems: understanding social, organizational and technological systems, monitoring and correcting performance, and designing or improving systems
- Technology: selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies

The commission also suggests that these competencies require the following three-part foundation:

- Basic skills: reading, writing, arithmetic and mathematics, speaking and listening
- Thinking skills: thinking creatively, making decisions, solving problems, seeing things in the "mind's eye," knowing how to learn and reason
- Personal qualities: individual responsibility, self-esteem, sociability, self-management and integrity

In its final report, *Learning a Living: A Blueprint for High Performance*, SCANS offers five recommendations, including incorporating the SCANS foundation and competencies into education and training in schools and workplaces, building them into the national assessment systems being proposed, and using them as the basis for further discussion on improving the skills of American workers. As part of this comprehensive nationwide agenda, the commission recommends establishing for all students a cumulative resume. Beginning in middle school, the resume would contain information about courses taken, projects completed and assessment grades earned. When a student reaches the performance standard for certification in a SCANS competency, that certification would be noted on the resume.[63]

SCANS argues that such a resume has considerable benefits for student and employer. For the student, the resume becomes a permanent record of genuine attainment. Employers will benefit from the expectation that their businesses can demand higher levels of competency. The assumption is that improvements in employee quality enable businesses to move toward a high-performance workplace.[64]

The Educational Testing Service (ETS) is marketing a similar system called *Worklink*, a unit record system that provides employers a transcript or record of work-related skills acquired by high school students. The system is being tested in Tampa, Florida, and Pasadena, California.[65]

A complementary Department of Labor effort is the National Advisory Commission on Work-Based Learning (NACWBL). The NACWBL was convened to create a system to link education and the workplace. One of the commission's charges involves developing workplace skill standards and certification. Ira Magaziner, head of the subcommittee on this issue and chair of the Commission on the Skills of the American Workforce, notes that the work of the subcommittee will build on SCANS' work. The subcommittee's agenda includes:

- Assisting the Departments of Labor, Education and Commerce to develop a working partnership with key players in industry, education, labor, state and federal governments to determine the demand for and shape of a national framework for skills standards
- Assisting the Departments of Labor and Education to initiate pilot projects to develop industry standards
- Assisting the Departments of Labor and Education to establish the research, technical assistance and support base
- Providing leadership and coordination to industry, labor and education groups who already are working to develop industry-based skills standards.[66]

An additional initiative is being developed jointly by the federal Departments of Labor and Education. The effort asks business and labor "to adopt a strategy to establish job-related (and industry-specific) skill standards, built around core proficiencies, and to develop skill certificates to accompany these standards." The effort will be informed and supported by the foundational work of SCANS and NACWBL.[67]

Another national skill assessment effort is based on the Perkins Act. Title I, Part B, Section 115 requires all states to develop "a statewide system of core standards and measures of performance for secondary and postsecondary vocational education programs" within two years of enactment for all programs authorized by the act (September 1990). The act requires that state-developed performance standards include:

- Measures of learning and competency gains, including student progress in the achievement of basic and more advanced academic skills
- One or more measures of performance, including competency attainment, job or work skill attainment; retention or completion of secondary school or its equivalent; and placement into additional training or education, military service, or employment

- Incentives or adjustments designed to encourage services to special populations and, when appropriate for each student, consistent with an individualized education plan developed under the Education of the Handicapped Act

- Procedures for using existing resources and methods developed under other programs receiving federal assistance

Each state is required to develop these standards in consultation with a "committee of practitioners" representing schools, organized labor, business, school superintendents, community-based organizations and Private Industry Councils (PICs) as established under the Job Training Partnership Act (JTPA). In addition, the vocational education standards developed by the states are to take into consideration the standards and measures developed for the Family Support Act of 1988 (Job Opportunities Basic Skills Program or JOBS) and JTPA.[68]

Similar to the initiative under way by the Department of Labor, another section of the act authorizes the Department of Education, in consultation with the Department of Labor, to establish a competitive grant program to develop national standards and competencies in industries and trades. The grants will go to industrial trade associations, labor organizations or comparable national agencies to organize business-labor-education technical committees. These committees will propose national standards that will include:

- Major divisions or specialty areas identified within occupations studied

- Minimum hours of study necessary to be competent in these divisions or specialty studies

- Minimum tools and equipment required

- Minimum qualifications for instructional staff

- Minimum tasks to be included in any course of study purporting to prepare individuals for work in such divisions or specialty areas.[69]

There is growing concern that without coordination of efforts, separate assessment activities will become increasingly isolated and rigid, and will contribute little to an overall assessment system. For example, the National Goals task force assessing postsecondary education suggested that these various activities being undertaken by the U.S. Departments of Education and Labor should be better coordinated.

State Systems To Assess Student Skill Levels

A few states also are beginning to develop examinations of students' mastery of employment-readiness skills. In a recent national survey of these efforts, the Missouri Department of Education reported it is developing an examination using resources provided under JTPA. It also has

developed a set of core competencies (several employment-related) for all public school students with a statewide criterion-referenced testing program that measures mastery at the 3rd, 6th, 8th and 10th grades. All of Missouri's vocational education curriculum contains instructional units on employment readiness skills on which students are tested for mastery.[70]

A new assessment and certification system is being developed for vocational education programs in California high schools, regional occupational programs/centers and adult education. The primary impetus for developing the California Vocational-Technical Student Assessment and Certification Project (VTSACP) is to recognize students who have achieved proficiency on the key vocational and academic skills related to their vocational field of interest. Certification should increase a student's opportunities to obtain a good job or to gain admittance to college or some other advanced training program upon graduation.[71]

Under the newly formed Rhode Island Skills Commission, a consortium will set educational standards and design new performance assessments based on recommendations made by the Commission on the Skills of the American Workforce in *America's Choice: high skills or low wages!* Similarly, the Illinois Workplace Preparation Council will bring the public and private sectors together to identify skills required for the workplace and help ensure that programs develop those skills in the most effective way.

Implications for Higher Education

Given the extraordinary national interest in new kinds of skills assessment, higher education institutions will come under pressure to adjust their criteria for admission and transfer as well as their own assessment practices. Many admissions officers, however, remain skeptical of competency-based exams, portfolios and ungraded evaluation systems. They argue that these changes have yet to be judged as adequate predictors of college success and will be cumbersome to use in the admissions process because of their complexity.

A related issue which both states and institutions are currently facing is the value and acceptability of the new "applied academics" courses being developed for secondary and postsecondary vocational education. Many in higher education will continue to resist the acceptance of such courses for admissions and transfer purposes, preferring instead the traditional "academic track" high school curricula. Shifting to competency-based criteria and away from Carnegie units will take time and demonstration that the new courses and accompanying assessments are evidence of high standards.

Students in four-year undergraduate programs, of course, also need to acquire the skills necessary for employment success. Undergraduate programs would benefit greatly from an examination of the skills identified by SCANS and others which lead to success on the job. Such efforts are already underway in the field of teacher preparation and professional development under the direction of the National Board for Professional Teachers Standards.

Supporting Resources

The Career College Association (CCA), which represents over 2,000 postsecondary career-education institutions, recently underscored its commitment "to develop a workforce next to none in skills, productivity and competitiveness," by issuing a statement of principles on achieving workforce competitiveness. Among these was a call for "a clear understanding of what types of knowledge and skills are needed by today's and tomorrow's economy."[72]

Some support for designing assessment instruments and tools soon may be available. The American College Testing Program (ACT) has developed a system for teaching and assessing employability skills, called *Work Keys*. It is intended as a tool to help change the ineffective relationship between learning and work. The system combines instruction and assessment with outcomes related to work. It has four interactive components:

- A systemic process for profiling individual jobs according to the specific skills they require
- A variety of tests and assessment procedures for measuring a person's job-related skills
- Formats for recording and reporting assessment results
- Instructional materials and resources directly related to skills that are profiled and assessed

ACT reports that the system will ease communication among employers, educators and learners. Employers will profile their jobs in terms of the specific skills employees need to perform. Educators will have parameters for the development of curriculum and instruction designed to bring workers up to desired levels in these skill areas. Learners will be better able to understand links between education and work and more motivated to persist in developing the skills, both of which will contribute to their success and satisfaction in the workplace.[73]

STATE PLANNING AND COORDINATION

Problem: Numerous state and federal programs provide services for education, training and retraining of workers. These programs are administered by a multitude of state agencies and governance structures. As a result, the information is fragmented, services are duplicated or not provided, and opportunities do not reach enough of the people who need them the most. These fragmented systems provide few incentives to promote integration across programs and severely limit the ability of states to develop comprehensive policies.

Many policies and programs drive vocational education and job training in this country. At the federal level, the Departments of Education, Labor, Agriculture and Health and Human Services administer programs targeting some form of employment training. The following is a brief description of the major initiatives.

- **Department of Education:** Vocational education services are supported through the Perkins Act. Federal funds supplement state and local funds, which provide the majority of financial support for secondary, postsecondary and adult vocational education programs. The act targets special populations such as the handicapped, the economically disadvantaged and persons with limited English proficiency. Three-quarters of federal funds are distributed to local education agencies, area vocational-technical schools and postsecondary institutions.[74] The intended outcome is to prepare students for entry-level jobs. Some postsecondary programs prepare students for mid-level jobs.[75]

- **Department of Labor:** JTPA provides short-term job training, including job search assistance and basic education and occupational skills for economically disadvantaged youth and adults and displaced workers. Funds are distributed to states in a block grant, 78% of which must be spent on training and distributed locally. Unlike vocational education where state and local funding predominate, nearly all funding for JTPA comes from the federal government. Federal regulations apply to all programs nationwide.[76]

- **Department of Agriculture:** Under the Food Security Act of 1985, the Food Stamp Employment and Training Program provides education and job training for Food Stamp recipients, ages 17-59. The purpose is to reduce reliance on this welfare benefit.[77]

- **Department of Health and Human Services:** The Family Support Act of 1988 requires all states to develop JOBS programs that will help welfare recipients. The legislation provides federal matching funds—ranging from 50% to 72% of total costs—for a variety of work-related

services. Some of these include job search, work experience, counseling, child care and other support services. Funds also may be used for remedial education, vocational education and training.[78]

In addition to state funds supplementing or matching federal programs, states have developed individual initiatives geared to workforce preparation. In most cases, the central purpose of these efforts is to enhance the state's economic development.

These federal and state programs have diverse fund sources, purposes and targeted populations and are implemented by a variety of institutions. For example, secondary vocational education is provided in both local high schools and vocational-technical institutes. Postsecondary vocational education is offered predominantly in community colleges, vocational-technical institutes and proprietary schools.

The providers of JTPA training differ in each locale. In some places, community colleges are major providers. In others, services are provided by community-based organizations, with community colleges playing a very limited role. A study conducted by the National Center for Research in Vocational Education explains:

> [V]ariations stem from the fact that the federal program establishes expectations about program targets and outcomes, but not about providers or services (except to specify some very general parameters). As a result, the local political and organizational context exerts a major influence on how the policy is implemented. Factors such as the historical mission of education and training institutions in different communities (e.g., whether the community college is primarily transfer-oriented) and political relationships between key constituency groups and elected officials are significant in shaping local JTPA programs....[79]

This also seems to be the case with the federal welfare-to-work programs.

The complexity of the system is reflected in which agencies administer these programs as well. States typically have no single agency with responsibility for secondary and postsecondary vocational education; program administration is divided among a number of agencies. These can include a department of education; independent board, commission or council; higher education or community college system; office, division or department of higher education; department of vocational/technical education; licensing board; and other agencies. About 38% of the states administer vocational education programs through a separate agency. Only eight states provide for same-agency administration of vocational education programs for all three types of postsecondary institutions.[80]

The problem with this level of diversity is that each program tends to function in isolation. There is little coordination of program outcomes across agencies and there is almost no consolidation of limited resources.

Needed Change: States and local communities need the ability to focus resources from multiple sources on a comprehensive workforce preparation plan and strategy.

States are recognizing that to develop a competitive workforce requires coordinating the various initiatives targeted at workforce preparation. Such effort carries tangible benefits. Valuable resources are used more effectively. Duplication of services is eliminated. Coordination ensures that the education, training and retraining continuum is strengthened. Partnerships made up of education, business, labor and government are enhanced and supported. The result is that the direct beneficiaries of a workforce training program—the worker and the employer—build competence and confidence and reap economic rewards. Thus, the economic development of the state and local communities is reinforced. The following are a few of the more current coordination efforts.

Program Coordination

As noted earlier, Texas recently created a comprehensive strategy for developing a high-skilled workforce. The Texas Quality Workforce Planning effort is designed to identify employer needs and ensure that students who complete vocational-technical education and training programs are prepared for employment in the year 2000 and beyond. The plan has four components: (1) development of a partnership made up of education and training providers and business and industry, (2) coordination of vocational-technical education programs, (3) collection and analyses of information related to regional workforce needs, and (4) development of regional service-delivery plans.[81]

In New Jersey, the State Employment and Training Commission (SETC) focuses on the coordination of resources and services. The commission recently was created to develop and assist in the implementation and evaluation of an employment and training policy for the state. It involves the state departments of higher education, education, labor, human services, community affairs, commerce and economic development and is authorized under state statute to serve as the "State Job Training Coordinating Council." Its mission is to create a workforce-readiness system that will provide accessible, integrated and effective services so that New Jersey citizens may acquire the skills necessary to become and remain productive. The commission operates with a mixture of direct state funding and federal funding under the JTPA administrative resources.

In April 1991, Arkansas began a major reorganization of postsecondary technical education. Fourteen former postsecondary vocational-technical schools have been re-established as technical colleges with administrative and policy oversight by the State Board of Higher Education. Each technical college has entered into a contractual relationship with an accredited public higher education institution to offer fully transferable general education courses at the technical college site. Credits for these courses fulfill requirements toward an associate degree. In addition, each

college has been reviewed by outside evaluators to determine what steps must be taken to achieve regional higher education accreditation.

In Washington, the Governor's Economic Development Cabinet conducted a recent assessment of the condition of the local economy. This resulted in a report entitled, *The Forces that Shape Washington's Economy and their Implications for Policy Makers*. It makes a compelling case for examining state economic development comprehensively through improvements to education, workforce training, infrastructure, housing and the environment. For example, under education, the report lists the following findings.

- New work-production methods mean that students must be prepared to handle complex tasks, solve problems and learn new skills continuously throughout their working lives. Students will need critical thinking and human-relations skills to work in teams and to take responsibility for the quality of their work.

- Because science and technology is a key to increased competitiveness, education must prepare students to become competent workers and managers, as well as to conduct basic and applied research.

- Because small business relies on training to stay competitive, there will be an increased demand for access to quality training at a relatively low cost.

- Better methods must be found to link the training needs of small-to-medium-sized businesses with public education programs.

- As the effective size of the labor pool shrinks, Washington industry is faced with two choices: (1) importing workers or (2) training the "hard-to-train." If the second strategy is adopted, it will require rethinking how training can be structured and delivered.

- Consistent fund sources are needed for all levels of worker training and public education.[82]

The Florida Postsecondary Education Planning Commission recently proposed an interagency task force to develop a coordinated plan outlining the future role of postsecondary education in the state's economic development. It will be made up of the Department of Education in collaboration with the High Technology and Industry Council, the Florida Education and Industry Coalition, Department of Commerce, Department of Labor and Employment Security, the Governor's Office, State Chamber of Commerce, business leaders and others. The commission hopes the plan will address:

- The need for consolidation and coordination

- Adequacy of funding initiatives

- Alternative sources of support

- Policies and rules affecting economic development and postsecondary education

Additionally, in response to recent legislation, the Florida Department of Education will establish a planning process to identify future training needs for state industries.

Data Coordination

In addition to coordinating programs, states should develop coordinated efforts to collect data on students and workers. The Illinois policy on workforce preparation provides the following recommendation:

The Board of Higher Education, Community College Board and State Board of Education will ensure accountability for the results of educational and training programs by:

- Coordinating accountability systems and information developed by higher education with accountability systems developed by the State Board of Education, including the Illinois Goal Assessment Program, the Perkins Act Performance Standards and the School Recognition System

- Incorporating information from all state workforce preparation programs into a data system to eliminate excessive duplication of monitoring and record keeping

- Developing an Employer Feedback System that provides information about the progress and performance of former students in the workplace with cooperation from the Illinois Department of Employment Security

U.S. Department of Education recommendations for nationwide data collection include improving the statistics on students after they leave postsecondary institutions. One alternative methodology for determining employment rates of graduates is available at the state level by electronically linking files on graduates with available Unemployment Insurance (UI) Wage-Record Data.[83] This approach has been used successfully in tracking completers of Job Training Partnership Act (JTPA) programs and has proved to be more cost-effective than gathering this information through contact with participants.

Many states already are linking their enrollment and graduation files to state salary and wage records. For example, Florida has implemented the Florida Employment Training Placement Information Program (FETPIP). It uses UI records to monitor employment outcomes of postsecondary graduates and dropouts. To supplement UI data and to adjust for incomplete coverage, the state has implemented cooperative agreements with other state and federal agencies to extend the coverage of FETPIP to employers not included in employer records. Finally, the institutions survey

graduates for whom no wage data are found in an attempt to account for completers who are unemployed, self-employed, not in the labor market or employed out of state.

SHEEO urges state higher education boards to support these activities and help find resources necessary to broaden the states' coverage with these systems.

INCENTIVES/ACCOUNTABILITY

Problem: Quality workforce-preparation programs will be as expensive as other kinds of excellence in higher education. However, what has changed is the ability of states to provide this support. Few will be able to undertake these efforts alone. Identifying and funding model programs will be fundamental to turning around the poor reputation of existing programs and their lack of public credibility. Funding policies based solely on workload will no longer suffice. New financial and accountability incentives are necessary to stimulate internal restructuring and to marshal support from stakeholders.

A system of high-quality vocational and occupation education will not be inexpensive; it will require major societal investment. Technical programs, whether at the secondary or postsecondary level, require specialized equipment and highly trained faculty. German companies, such as Siemens and Schering, estimate their annual trainee costs for technology fields at around $18,000 per student, including about $6,000 for wages to the apprentices. A typical two-year program in a trade technology or a health science program in the United States averages about $7,400 per full-time student. (Some program costs may run as high as $14,000 to $15,000 FTE because of factors such as high equipment costs and low faculty-to-student ratios.)[84] To educate a student in a tech-prep (2+2) program in these disciplines may cost significantly more.

Many American secondary and postsecondary institutions are deterred by these costs from starting up new programs in technology fields. For example, not until industry representatives donated equipment could Minnesota institutions start a new dental hygiene program, even though the Minnesota Higher Education Coordinating Board authorized and approved the program. In fields such as electronic printing, it has become impossible for programs to equip themselves properly from traditional sources of support.

Public community colleges find themselves in a dilemma. Generally, the programs they can afford to start up (and those with immediate demand) are in low-cost fields, such as day-care and retail service, where wages are also low. These programs tend to use part-time faculty and require little equipment. However, as valuable as they may be, they do not contribute to revitalization of the nation's industrial capacity.

Although basic skills education is less expensive than technical education, it too needs improvement. Faculty teaching these courses should be targets for new investment and incentives. Quality instruction in vocational and occupational programs cannot be less a priority than that expected in a quality baccalaureate program.

Needed Change: The ability of states and institutions to make these investments will depend on two fundamental changes: internal reform of the institutional management to increase efficiencies and new sources of external support. Both changes imply new financial incentives and accountability mechanisms.

The U.S. system of funding postsecondary vocational education appears to be a fragmented and confusing array of federal, state and private sponsorship. But if properly coordinated, this diversity of sources has its advantages. Each partner—state, federal government, employer, individual—becomes a stakeholder in the quality of the enterprise.

Given the nature of restructuring undertaken in American companies during the past decade, it seems unlikely that higher education can be immune to change. Administrative costs will need to be cut and curriculum focused more tightly. Burdensome state and federal regulations need to be eliminated. A "customer-first" attitude needs to be incorporated into educational institutions. Faculty development and "total quality management" strategies need to be implemented. Learning technologies and self-directed student learning need to be applied to improve quality while cutting labor costs. In short, a transformation in the managerial and academic structure of institutions is needed if the nation is to respond to these new challenges. Out of this transformation will come some internal savings for quality improvement.

Paying for improved quality will require new societal investments from all partners— taxpayers, employers, state governments and students. This may come in the form of tax incentives, changes in state funding and tuition policies, individual and organizational incentives tied to performance and expanded federal support. Specifically, SHEEO recommends policy makers consider the following:

Incentives for Employers To invest in Training

It is unlikely that states or postsecondary institutions will be able or willing to invest in new technology degree programs without substantial partnerships with business. Industry-based apprentice programs require major investments from participating companies. Many developed nations require business and industry to invest in developing and improving workers' skills. These contributions are organized as part of national strategies for education, training and skills development. For example, the Swedish government establishes renewal funds to which all companies of a certain size are required to contribute 10% of net profits. The tax-deductible contributions are placed in an interest-free account and may be withdrawn later to support company training approved by the government and local unions. In Singapore, employers contribute 1% of payroll annually to the Skills Development Fund. This fund is used by the government to partially reimburse companies for approved forms of training, including apprenticeship and in-house training, and external training in recognized courses offered by accredited

institutions. Additionally, employers receive twice the normal reimbursement for training in high technology and economically critical skills.[85]

In contrast, this country provides few incentives for developing a national quality workforce preparation system. Tax laws do not encourage American companies to invest in training. Limited value is placed on workers as national assets. American employers spend about $30 billion (1.4% of the national payroll), on formal training and development.[86] However, this figure is deceptive. Only a small percentage of employers spend more than 2% of payroll on training; the vast majority are well below 1%.[87] Small employers (fewer than 500 employees), who account for about half of all jobs in the American economy and 40% of new jobs being created, provide the least amount of training for their employees. One reason is that they do not have enough employees to afford the lost time required for training during work hours. Also, they fear losing trained employees to competitors and find the cost of financing training and education too high.[88]

Job-related education and training in the United States must become more evenly distributed among the population. Currently, only one in 10 employees gets any formal training after he or she begins work. Training and development tend to be concentrated among white collar and technical elites, with production and service-delivery personnel receiving much less training. White employees (who make up 86% of the workforce) receive a disproportionately large share of training—92.2% vs. 7.8%—compared to African Americans and Hispanics who, combined, make up approximately 15% of the workforce.[89]

Tax structures should encourage private industry investment in future education and training of workers. Business and industry should be provided incentives to pursue high productivity forms of work organization. Unlike some European countries, the United States has no federal or state corporate tax credits that stimulate new investment in training.[90] The only federal employment tax credit, the Targeted Jobs Tax Credit (TJTC), essentially subsidizes employers for the same hiring and retention practices they would have used without the credit.[91] This was confirmed in a recent study of the tax credit by the U.S. General Accounting Office (GAO). GAO reports that more than half of employers interviewed relied on their normal employment practices to find workers. If these practices resulted in the hiring of a worker from a group targeted by TJTC, the employer claimed the tax credit. Further, these employers did not change their training practices for TJTC-eligible workers. As a result, there were no special efforts to retain these workers.

Greater Use of a "Contract-for-Services" or "Outcomes-Assessment" Funding Model

The development of new skills assessment instruments by industry and their requirement by the federal government through such programs as JTPA and Perkins Act suggests that concrete measures of the effectiveness of vocational and occupational programs may soon be available. The JTPA model of "contract for services" might be considered by federal and state governments as a substitute for the current mix of enrollment-based funding and student-carried financial aid. School boards in Minnesota have the ability to contract with new "charter schools" for education

services. Could higher education be next for this type of reform? Funding sources, including federal and state governments, could contract to education specified numbers of students who have obtained designated skill levels in various occupational fields. These contracts might be expanded to a broader array of both public and private providers.

Some states, such as Texas, Colorado and Tennessee, are providing specific financial incentives for designated outcomes. While it may be easy to reward institutions by funding degree or certificate attainment, SHEEO believes it will be more productive in the long term to fund specific "skills acquisition."

However, funding outcomes is no substitute for providing support for the ongoing workload of higher education institutions. If states choose to shift greater responsibilities for enrollment to the two-year sector, they will need also to shift resources through enrollment-based formulas.

SHEEO also supports state competitive grant programs and structures, such as *EnterpriseOhio*, which link two-year institutions with business partners. EnterpriseOhio is a statewide network expanding the role of Ohio's public two-year institutions in providing customized job training and human resource development. The total investment in the program since its inception in 1987 totals approximately $10 million.

A Reexamination of State Tuition and Program Subsidy Policies

States are under considerable pressure to increase public-sector tuition. Higher education's share of state budgets, because of competing priorities such as health care and criminal justice, has been in a decade-long decline with no end in sight. It may be appropriate for some states to reexamine public tuition policy toward establishing more consistent long-term policies. States also may want to reexamine the types of courses and programs receiving subsidies. For example, they may want to end subsidy of programs in which graduates are earning only minimum wage or where placement rates are low due to poor curriculum or a changing job market.

The funding of remedial programs in postsecondary education also must be addressed. Some states oppose all funding of postsecondary remediation, while others provide supplemental funding greater than degree credit. Regardless of policy, the need for postsecondary remediation is substantial and not likely to disappear in the near future. One problem with the discussion of remediation is that it assumes a clear demarcation between secondary and postsecondary skills. But all students need a higher level of skills acquisition.

The contract-for-services approach also can be applied to what are now considered postsecondary remedial courses. The state, using externally developed exams, may call upon both its secondary and postsecondary institutions to ensure its population reaches a certain level of skill acquisition. For example, the state may choose to support 10,000 postsecondary students to a designated level of math competence in a given year. Institutions would bid to educate a specified portion of this

number and then be paid when students acquire the skills. Productive institutions would receive 100% reimbursement; less productive institutions, lesser amounts.

Mechanisms for Rewarding Excellence in Vocational and Occupational Programs

Few existing state licensing laws and accreditation procedures provide meaningful incentives for excellence. Most state licensing and program review procedures in vocational/occupational education provide a floor for minimally acceptable practice to protect consumers. In contrast, the "total quality management" (TQM) process adopted by many major corporations and an increasing number of higher education institutions can be used as a tool to transform institutions to provide lower costs and higher quality. The central principle of TQM is continuous improvement in process and product. With its "customer" orientation and its "bottom-up" change strategy, TQM has great potential to improve vocational and occupational programs.

Minnesota has developed a strategy for undertaking the TQM process in its schools and institutions. To further encourage excellence among its educational institutions, the state has adapted the Malcolm Baldridge National Quality Award (recognizing quality and productivity in private industry).[92] Educational institutions demonstrating quality programs and high productivity will be recognized by the award.

Incentives for Rewarding Faculty To Improve Their Skills

Incentives also would support higher-quality teacher preparation. The Arkansas technical education restructuring initiative discussed earlier places technical faculty at each institution on a pay plan that rewards educational attainment, workforce experience and continuing professional development. For faculty without the necessary higher education credentials, the state has established a faculty professional development plan that provides tuition assistance and brings needed degree programs to off-campus sites through interactive video. Similarly, the New Jersey Departments of Education and Higher Education have identified needed improvements in preparing and training teachers and counselors in career education as a long-term priority of their unified state plan for workforce readiness. The agencies are considering changes in teacher education requirements and inservice training programs to include training in workplace skills.

Another way to improve the quality and technical expertise of postsecondary vocational and technical faculty is to reassess reward policies at community colleges. For example, the Ohio Board of Regents offers incentives to faculty at two-year institutions through the "Productivity Improvement Challenge." The funding encourages institutions to be responsive to the job training needs within their communities. A challenge grant to Lorain County Community College, Stark Technical College, North Central Technical College, Marion Technical College and Lima

Technical College was used to create a "Train the Trainer" consortium. Each institution in the program identifies its special resources and makes them available to other colleges. If one institution has great expertise in computer or engineering technology, it becomes the training site for faculty from other institutions to update their technical expertise.

A Final Word

> Each nation's primary political task will be to cope with the centrifugal forces of the global economy which tear at the ties binding citizens together—bestowing ever greater wealth on the most skilled and insightful, while consigning the less skilled to a declining standard of living.
>
> Robert B. Reich, *The Work of Nations*

The profile of a successful worker and workplace is changing. If American citizens are going to have opportunities for economic success, today and through the generations, they will need to have the skills most valued to a world economy. They will need to be able to communicate, compute, solve problems and work as part of a team.

The nation's philosophies on education must be expanded to recognize the value of and promote preparation for work. Collaboration and partnership must form the foundation for education systems that incorporate both classroom and work-based learning. These systems must prepare students for occupations and careers that are ever-changing, and they must be flexible to allow students access to them throughout their working lives.

Finally, opportunities for success cannot be limited to the few. This country's investment in building the knowledge and skills of *all* of its citizens will reap high returns. New technologies will be developed. Jobs will become plentiful.The nation's economy will be strengthened.

NOTES

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13. Kominsky, Robert, *What It's Worth* (Washington, D.C.: U.S. Department of Commerce, Bureau of the Census, October 1990).

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15. Illinois Board of Higher Education, *Report of the Committee to Study Preparation of the Workforce* (Springfield, Illinois: October 1, 1991), p. 18.

16. Bottoms, Gene, *What Have We Learned?* SREB-State Vocational Education Consortium (Atlanta: Southern Regional Education Board, 1991).

17. Hull, Dan and Dale Parnell, *Tech Prep Associate Degree: A Win/Win Experience* (Waco, Texas: Center for Occupational Research and Development, 1991).

18. Hull and Parnell, p. 26.

19. James, p. 156.

20. James, pp. 158-163.

21. Belcher, Cliff, "Smoothing the Rough Spots," *Tech Prep Associate Degree: A Win/Win Experience*, Dan Hull and Dale Parnell, eds. (Waco, Texas: Center for Occupational Research and Development, 1991), p. 115.

22. The Carl D. Perkins Vocational and Applied Technology Education Act of 1990, 20 U.S.C. Sec. 2394, 2394(a) and (b) (Supp. 1988). A study by the National Center for Research in Vocational Education, University of Illinois at Urbana-Champaign, shows all states are planning tech-prep programs. In a few states, the state higher education coordinating or governing boards have a lead or collaborating role with the state department of education and other education and business organizations in coordinating these efforts. These states include: Alabama, Arkansas, Indiana, Massachusetts, Montana, New Jersey, Ohio, Tennessee, Texas, Utah and West Virginia.

23. Perkins Act, Sec. 2420 (Supp. 1988).

24. Hull, Dan, "Getting Off the Ground: The Basics of Developing a TPAD Consortium," *Tech Prep Associate Degree: A Win/Win Experience*, Dan Hull and Dale Parnell, eds. (Waco, Texas: Center for Occupational Research and Development, 1991), p. 42.

25. The concept of certificates of initial and advanced mastery were introduced by the Commission on the Skills of the American Workforce in *America's Choice: high skills or low wages!* In addition to being adopted in Oregon's school reform initiative, mastery certificates have been espoused by the Secretary of Labor's Commission on Necessary Skills (SCANS) in their two reports, *What Work Requires of Schools* and *Learning a Living: A Blueprint for High Performance*.

26. *A More Productive Workforce: Challenge for Postsecondary Education and Its Partners, Conference Highlights* (Washington, D.C.: American Council on Education, May 1989).

27. *Training Strategies: Preparing Noncollege Youth for Employment in the U.S. and Foreign Countries* (Washington, D.C.: U.S. General Accounting Office, May 1990).

28. In addition to this review, other studies comparing American and foreign training systems have been conducted by the Commission on the Skills of the American Workforce (*America's Choice: high skills or low wages!*), the Council of Chief State School Officers (*European Lessons from School and the Workplace*), the Education Writers of America (*Training for Work: What the U.S. Can Learn from Europe*).

29. The Commission on the Skills of the American Workforce, *America's Choice: high skills or low wages!* (Rochester, New York: National Center on Education and the Economy, June 1990), p. 60.

30. Commission on the Skills of the American Workforce.

31. Jackman, Michele, "Taking Instructional Technology into the Next Century," *The Community, Technical and Junior College Times* (Washington, D.C.: The American Association of Community and Junior Colleges, November 5, 1991), p. 7.

32. *Texas Quality Work Force Planning: Preparing Texas for the 21st Century Through a Skilled and Educated Work Force* (Austin, Texas: Texas Education Agency, 1991).

33. New Hampshire Automotive Education Foundation, Inc., *Focus on Excellence* (Concord, New Hampshire: Fall 1990).

34. *Occupational Competencies: A Study of the Vocational-Technical Education Needs of the Agribusiness and Chemistry-Based Technology Industries* (Washington, D.C.: National Council on Vocational Education, January 1990).

35. The GAO defines cooperative education placements as short-term apprenticeships, with schools fulfilling the oversight role taken by state or federal agencies in apprenticeship programs. For purposes of this report, apprenticeships and co-op programs are considered the same.

36. *Transition from School to Work: Linking Education and Worksite Training* (Washington, D.C.: U.S. General Accounting Office, August 1991), p. 27.

37. *Transition from School to Work*, p. 38.

38. *Work-Based Learning: Training America's Workers* (Washington, D.C.: U.S. Department of Labor, Employment and Training Administration, November 1989), pp. 7-8.

39. *Transition from School to Work*, pp. 10-11.

40. "Connecting School and Employment," *Concerns* (Washington, D.C.: Council of Chief State School Officers Resource Center on Educational Equity, December 1991), p. 5.

41. "CCSSO State Grant Program: New Career Paths Through Youth Apprenticeship," *Concerns* (Washington, D.C.: Council of Chief State School Officers Resource Center on Educational Equity, July 1992), p. 13.

42. U.S. Congress, Senate, "National Youth Apprenticeship Act of 1992 — Message from the President." 102nd Congress, 2d sess., 13 May 1992, *Congressional Record*, vol. 138, S6593-94.

43. James, pp. 163-165.

44. James, pp. 163-165.

45. Illinois Board of Higher Education, p. 23.

46. MGT of America, Inc., pp. 148-149.

47. MTG of America, Inc. pp. 147-153.

48. Council of Chief State School Officers, *European Lessons from School and the Workplace* (Washington, D.C.: 1991), pp. 20-21.

49. Commission on the Skills of the American Workforce, p. 45.

50. Council of Chief State School Officers, *European Lessons from School to the Workplace*, pp. 41-42.

51. Council of Chief State School Officers, *European Lessons from School to the Workplace*, pp. 41-42.

52. Kirsch, Irwin S. and Ann Jungeblut, *Literacy: Profiles of America's Young Adults* (Princeton, N.J.: National Assessment of Educational Progress, Educational Testing Service, 1990).

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54. Research and Evaluation Associates, Inc., pp. iii-v.

55. Korb, Roslyn, *Postsecondary Student Outcomes: A Feasibility Study* (Washington, D.C.: National Center for Educational Statistics, U.S. Department of Education, Office of Educational Research and Improvement, February 1992).

56. Korb, pp. 16-18. This survey indicates that 72% of public two-year institutions, 82% of public less-than-two-year institutions, and 63% of private nonprofit two-year and below institutions collect this information.

57. Florida Statute Section 233.0695 and State Board Rule 6A-10.040. The Florida State Board of Education has approved four tests to assess student mastery of basic skills: American College Training Career Planning Program (Short Form of Assessment Booklet), Comprehensive Test of Basic Skills (Level H-J—measuring grade levels 7-12), Test of Adult Basic Education (1967

Edition Forms 1 & 2 or 1986 Education Forms 5 & 6 — complete battery), and Wide Range Achievement Test (level 2) (Tallahassee: Postsecondary Education Planning Commission, *An Assessment of College and Vocational Preparatory Programs*, 1990), pp. 22-24.

58. Florida Statute Section 240.117, 228.072 (7)(f) and State Board Rule 6A-10.0315. Four written placement tests have been approved by the State Board of Education for assessing basic skills preparation for entry into college: ACT, SAT, MAPPS and ASSET (Tallahassee, Florida: Postsecondary Education Planning Commission, *An Assessment of College and Vocational Preparatory Programs*, 1990), pp. 9-11.

59. Council of Chief State School Officers, *European Lessons from School and the Workplace*, p. 45.

60. *The National Education Goals Report: Building a Nation of Learners* (Washington, D.C.: National Education Goals Panel, 1991), pp. 21, 192.

61. The Goal 5 Technical Planning Subgroup on International Workforce Skills, *Report to the Education Goals Panel* (Washington, D.C.: National Education Goals Panel, July 31, 1992), pp. 9-11.

62. The Secretary of Labor's Commission on Achieving Necessary Skills, *What Work Requires of Schools* (Washington, D.C.: U.S. Department of Labor, June 1991).

63. The concept of a Certificate of Initial Mastery (CIM) was introduced by the Commission on the Skills of the American Workforce in *America's Choice: high skills or low wages!* The CIM verifies that the holder has passed a series of performance-based assessments that incorporate a national standard of educational excellence. It also will "certify labor market readiness and the mastery of the basic skills necessary for high productivity employment." The commission argues that the CIM would not indicate the completion of a student's formal education, but would serve as a foundation for more advanced forms of education and training.

64. Secretary's Commission on Achieving Necessary Skills, *Learning a Living: A Blueprint for High Performance* (Washington, D.C.: U.S. Department of Labor, June 1992), 62-64. For detailed description of the SCANS skills, see SCANS, *Skills and Tasks for Jobs* (Washington, D.C.: U.S. Department of Labor, July 1992).

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66. National Advisory Commission on Workbased Learning, *Minutes of Full Commission Meeting* (Washington, D.C.: U.S. Department of Labor, July 22-23, 1992), pp. 8-12.

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68. The Carl D. Perkins Vocational and Applied Technology Education Act of 1990, 20 U.S.C. Sec. 2325 (Supp. 1988). See also, Larry Condelli and Mark Kutner, *Quality Indicators for Adult Education Programs: Lessons Learned from Other Programs* (Washington, D.C.: Pelavin Associates, Inc., February 1992), pp. 5-6.

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70.Council of Chief State School Officers, *State Initiatives for School and the Workplace* (Washington, D.C.: 1991), p. 28.

71. Anada, Sri, "Vocational-Technical Student Portfolios," *Portfolio News* (San Diego, California: Winter 1992), pp. 1-2.

72. *Achieving Workforce Competitiveness: A Statement of Principles* (Washington, D.C.: Career College Association, April 1992).

73. *Work Keys: National System for Teaching and Assessing Employability Skills* (Iowa City, Iowa: American College Testing Program, 1991).

74. Condelli, Larry and Mark Kutner, *Quality Indicators for Adult Education Programs: Lessons Learned from Other Programs* (Washington, D.C.: Pelavin Associates, Inc., February 1992), p. 5.

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81. Texas Education Agency, 1991, pp. 6-9.

82. *Forces that Shape Washington State's Economy and their Implications for Policy Makers* (Olympia, Washington: Governor's Economic Development Cabinet, December 1991).

83. Korb, p. 42.

84. See *Michigan Community Colleges Activity Classification Structure Data Book (1990-1991)* (Lansing: Michigan State Board of Education, Bureau of Postsecondary Education, April 1992), p. 55.

85. Commission on the Skills of the American Workforce, pp. 115-118.

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87. Commission on the Skills of the American Workforce, p. 82.

88. Carnevale and Gainer, pp. 17-19.

89. Carnevale and Gainer, pp. 23-47.

90. Commission on Workforce Quality and Labor Market Efficiency, *Investing in People: A Strategy to Address America's Workforce Crisis* (Washington, D.C.: U.S. Department of Labor, 1989), pp. 16-18.

91. *Targeted Jobs Tax Credit: Employer Actions to Recruit, Hire, and Retain Eligible Workers Vary* (Washington, D.C.: U.S. General Accounting Office, February 1991). The program is limited to certain economically disadvantaged employees (i.e., summer youth employees ages 16-17, youth ages 18-24, cooperative education students ages 16-19, vocational rehabilitation participants, Vietnam-era veterans, ex-felons and identified welfare recipients). It provides financial incentives to employers to recruit, hire and retain these targeted group members.

92. The SCANS report *Learning a Living* describes the purpose of the Malcolm Baldridge National Quality Award as promoting quality awareness, recognizing the quality achievement of U.S. companies and publicizing successful quality strategies. The "Baldridge model" rates companies in seven categories: leadership, information and analysis, strategic quality planning, human resource utilization, quality assurance of products and services, quality results and customer satisfaction. The Secretary of Commerce and the National Institute of Standards and Technology administer the award with cooperation and financial help from the private sector.

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